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Soviet Plans To Modernize the Food-Processing Sector

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An Intelligence Assessment

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Comments and queries are welcome and may be directed to the Chief, Soviet Economy Division, SOVA,

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Soviet Plans To Modernize the Food-Processing Sector [redacted] 25X1

Key Judgments

Information available as of 17 December 1984 was used in this report.

Faced with the need to reduce waste and improve the quality and variety of food available to the population, the Soviet leadership recently turned its attention to the long-neglected food-processing industry. The growth in output of industrially processed food slumped from an average annual rate of about 4 percent in 1971-75 to about 1 percent in 1976-80, and in four sectors—meat, vegetables and fruit, sugar, and vegetable oil—production fell. This dismal performance had its roots in an erosion in the quantity and quality of raw materials, critical shortfalls in investment, an aging and often inoperative stock of plant and equipment, bureaucratic squabbling, and labor shortages. [redacted] 25X1

Strategy

To help increase production, Moscow in the early 1980s adopted a two-pronged strategy to modernize the food-processing sector. The first phase, announced in the May 1982 Food Program, called for more investment to be supported by a sharp increase both in domestic production and imports of machinery and equipment. Imports were to account for one-fifth of the total investment in the food-processing industry. In 1983 the strategy was clearly being implemented. Domestic production of food-processing machinery grew by some 9 percent, and imports of processing equipment jumped 21 percent over 1982 levels. [redacted] 25X1

Although the industry has not had time to absorb the injections of new capital, food processing posted nearly a 3-percent rate of growth in 1983. Larger deliveries of produce and livestock from agriculture and some increased processing capacity accounted for much of the improvement. [redacted]

The Outlook for Imports

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We expect imports of food-processing equipment to reach between $4 and $4.4 billion in 1981-85—double the level of the previous five-year plan—and climb to at least $5.4 billion during 1986-90. Moscow will concentrate its future purchases on equipment for meat, dairy, fruit, and vegetable processing. [redacted] 25X1

As part of the Soviets' attempt to offset the imbalance of overall trade with Eastern Europe, we expect them to import in 1981-85 about $3.4 billion and in 1986-90 at least $4.2 billion in food-processing machinery from their traditional Communist Bloc suppliers—East Germany, Czechoslovakia, Hungary, Bulgaria, and Yugoslavia. Eastern Europe already accounts for about three-fourths of all Soviet imports of food-processing machinery, and any shifts in the pattern of trade probably will be toward these countries rather than the West. [redacted] 25X1

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Although Western exports of food-processing machinery to the USSR will rise, we believe Soviet concern over becoming dependent on the West and reluctance to spend hard currency will limit this trade with the Soviets to about $900 million in 1981-85 and to slightly more than $1.2 billion in 1986-90. Moscow will turn to the West for advanced technology, labor-saving equipment, high-capacity processing equipment, quality-control systems, and a wide variety of specialty lines. Current conditions in the international market indicate that competition among Western suppliers will be stiff. Countries most likely to benefit from increased sales to the Soviets include West Germany, Italy, France, Japan, the Netherlands, and Denmark.

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Despite the state of bilateral relations, we project small increases in the current low level of purchases of US machinery for meat, dairy, fruit, and vegetable processing. The Soviets, in our opinion, will give some contracts to US food-processing equipment firms as a gesture to improve overall trade relations, but will not increase purchases dramatically because of:

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- A lack of concessionary official credits

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- Unwillingness by US firms to include unlimited maintenance clauses in contracts.
- Soviet insistence on barter arrangements and embargo protection.

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Implications for the Industry

The Soviet plan to inject the food-processing industry with domestic and imported machinery should help boost production and improve the quality of processed foods, but we believe the payoff will not be as large or as immediate as Moscow anticipates:

- Despite the already large increases in funding, investment devoted to the manufacture of food-processing machinery is still small relative to total requirements, and long leadtimes are required to bring models into series production.
- Foreign equipment is more susceptible to breakdowns than domestic equipment under Soviet conditions.
- Soviet managers continue to resist the acquisition and use of equipment embodying new and unfamiliar technology.
- Ministries overseeing food processing continue to squabble over their responsibilities.
- Farms, procurement agencies, and the transportation network lack incentives to provide high-quality raw materials.

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Plans for 1981-85 call for output in the food-processing industry to increase by 4.1 percent per year. Largely because of shortfalls in growth of farm output, we project a growth rate of 2.5 to 3 percent per year. 25X1

Although Moscow will be unable to fulfill planned increases in processed food production—both in quantity and quality—the Soviet consumer will benefit from increased attention to the food-processing industry in the form of expanded variety, some improvements in quality, and an easing of the wide seasonal fluctuations in the availability of some products. 25X1

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Introduction

In 1982 the Soviet leadership adopted a Food Program to upgrade the entire food production and distribution chain, including processing, packaging, transportation, and storage.[1] This was the first time the neglected processing industry received such high-level attention. Indeed, former President Brezhnev, in a May 1982 plenum speech, pointed to the key role the processing industry was playing in the food complex's poor performance: "More and more we encounter a situation in which the bottleneck is created not by agricultural production, but by the processing and storage of products."

The current interest in food processing also reflects an awareness by Moscow that the least costly path to improvement in food availability lies in reducing the prodigious waste in the food network. A significant share—some 20 to 25 percent of waste, according to Soviet sources—occurs on the way to and within processing factories. Moreover, the consumer has become more sophisticated, demanding greater quality and variety in foodstuffs. As a result, Soviet officials have mounted a campaign both to expand the industry and to upgrade the technology and raise the level of mechanization used in the processing of food. Their plan is two pronged: to boost domestic production of food-processing machines and increase imports of processing equipment.

This assessment presents an overview of the organization and capabilities of the Soviet food-processing industry and the causes for its poor performance during the late 1970s and early 1980s. In addition, this report analyzes Moscow's strategy to overcome output constraints, giving special attention to current and projected trends in imports of processing machinery, as well as the outlook for production of processed foods.

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Industry Overview

By international standards, food processing in the USSR remains underdeveloped. Roughly 60 percent of the food harvest in the Soviet Union flows through the processing network, compared with typically 80 to 85 percent in the industrial West. With the exception of bread, sugar, and alcoholic beverages, consumption of processed foods also falls below Western levels. According to industry experts, fruit and vegetables represent the area of greatest difference. About 10 percent of the fruit and vegetables consumed in the Soviet Union are in canned, frozen, or dried form, in contrast to some 30 percent in the United States.[2]

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The Soviets rely on simple processing methods such as concentration, canning, or mixing. Less than 1 percent of all processed fruit and vegetables undergo flash freezing or freeze drying. Moreover, despite the large population and extreme ethnic diversity, the range of products is limited. For example, about 700 different meat items are manufactured in the USSR, whereas West Germany produces some 1,400 in 600 distinct grades. Nonetheless, the existing assortment of processed food items represents considerable improvement over that available in the 1960s.

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Administrative control of the food-processing sector is divided among nine all-union ministries, although three—the food-processing, meat and dairy, and fruit and vegetable ministries—do most of the processing.

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[2] These figures exclude fruit and other agricultural materials used in the production of alcohol.

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USSR: Administrative Structure of Food Processing

Level	*Organizations*
All union	*Commission for Questions of the Agro-Industrial Complex:* *USSR Ministry of the Fruit and Vegetable Industry* *USSR Ministry of the Meat and Dairy Industry* *USSR Ministry of the Fishing Industry* *USSR Ministry of the Food-Processing Industry* [a] *USSR Ministry of Procurement* *USSR Ministry of Agriculture* *USSR Ministry of Domestic Trade* *Central Union of Consumer Cooperatives* *USSR Ministry of Machine Building for Light and Food Industry and Household Appliances*
Union republic	*Union republic counterparts of all-union ministries and committees*
Oblast, kray, autonomous republic	*Working-level organizations subordinate to the all-union and union republic ministries. Each of the 8,513 production associations usually comprises several processing factories.*
Rayon	*Local organizations that cut across ministerial lines, concentrating authority for a given territory. Associations include all farms, processing enterprises, and agricultural service agencies in a county-size district. Under this system of administration, some processing facilities have been placed on farm sites, and an attempt has been made to base incentives on production in the entire complex so that problems are not passed from one branch to another.*

[a] *Comprises 34 subsectors.*

The actual ministerial functions cannot be easily delineated because the lines of responsibility for specific commodities are blurred. For example, the ministries of the food-processing industry, the fruit and vegetable industry, procurement, and agriculture, and the Central Union of Consumer Cooperatives each control their own fruit and vegetable canneries. 25X1

According to the Soviet definition, the food-processing industry comprises 10 sectors—meat, dairy, sugar, bread, fish, confectionery goods, fats and oils, flour, fruit and vegetables, and beverages.[3] (See figure 1 for a breakdown of output, capital stock, and labor, by sector.) Meat and dairy products represent the largest sectors in terms of value and tonnage. Processing sectors are divided alternatively in some cases into primary and secondary processing. Primary processed items—including flour, yeast, molasses, granulated sugar, and raw meat—can be sent directly to the retail network or used as raw materials for other processed products. Secondary processed foodstuffs—such as sausage, bread, and confectionery goods—undergo further processing and use a combination of primary processed foods as raw materials. 25X1

Although food-processing factories are located throughout the USSR, the heaviest concentration is found in the European portion of the nation. Sugar factories are centered in the Ukraine, Moldavia, and southern Russia, where about 90 percent of the sugar beet crop is harvested. Because of high perishability, processing of fruit, vegetables, beverages, and vegetable oil occurs largely in corresponding agricultural regions of Moldavia, the northern Caucasus, Central Asia, and the Ukraine. Meat and dairy processing is more widely dispersed because livestock is raised in all agricultural areas. Flour stores and transports comparatively easily, making it possible to establish bakeries in every town. Most of the fish is processed at sea on fishing boats or at canneries on the Baltic and Pacific coasts. 25X1

[3] These 10 industrial sectors for the most part do not correspond to ministerial divisions of responsibility, a situation that further complicates relations for food-processing enterprises. 25X1

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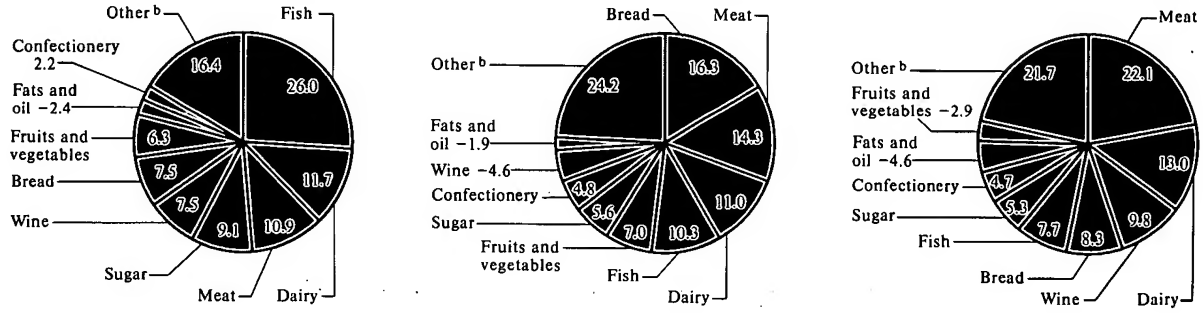
Figure 1
USSR: Structure of the Food-Processing Industry, 1980

Percent



[a] Food-processing organizations in the USSR numbered 5,600 in 1982, including 3,600 factories and 1,400 state collective farms.

[b] Includes flour and other milling, nonalcoholic beverages, beer, and other alcohol.

[c] Total work force in 1982 numbered 3,102,000.

Source: N. P. Sisolev, *Ekonomika Ryboy Promyshlennosti* (Moscow: Lyokaya i Pishchevaya Promyshlennost', 1983); S. E. Krasnov, *Ekonomika Myasnoy i Molochnoy Promyshlennosti* (Moscow: Lyokaya i Pishchevaya Promyshlennost', 1982); *Ekonomika Pishchevoy Promyshlennosti* (Moscow: Lyokaya i Pishchevaya Promyshlennost', 1981).

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Production: The Statistical Record

During 1976-80—a period of slowdown for Soviet industry as a whole—growth in output [4] of processed foods slumped from the average annual rate of nearly 4 percent achieved in 1971-75 to about 1 percent.[5] In four sectors (meat, fruit and vegetables, sugar, and vegetable oil), production fell. Industrially processed meat dropped from the 1975 peak of roughly 9.9 million metric tons to 9.1 million tons in 1980.[6] Total vegetable oil production fell from 3.3 million tons to about 2.5 million tons in the same period. Except for slight growth in flour and confectionery goods, the other sectors showed declining rates of increase (see table 1 and table A-1, appendix). Although supplies of labor and capital to the industry remained fairly stable, supplies of agricultural raw materials dropped appreciably during the period, slowing overall growth in inputs (see table 2 and figure 2). Other chronic problems plaguing the industry (which will be discussed below) worsened, dampening the rate of growth even further.

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Since 1980 production has picked up in most sectors. Top performers include the dairy sector and some of the previous laggards—the sugar and meat sectors. Larger harvests of fruits, vegetables, and sugar beets

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[4] To avoid the distortions in the Soviet gross value of output indexes that result from double counting and disguised inflation, growth in output has been derived from value-added indexes of processed food production. In comparison, the average annual rate of growth in the food-processing industry, measured in terms of gross value of output, declined from 4.4 percent to 0.7 percent during the period.

[5] Although the production of many processed items fluctuated during individual years of the 10th Five-Year Plan period (1976-80), overall growth was markedly below that of previous plan periods.

[6] About two-thirds of all meat is produced in industrial enterprises. Statistics do not include meat processed by private households or on socialized farms.

Table 1
USSR: Average Annual Growth of Processed Food Production [a]

Percent

	1966-70	1971-75	1976-80	1981	1982	1983 [b]
Total processed food	**5.8**	**3.9**	**1.1**	**2.0**	**2.8**	**2.9**
Fish	6.8	7.8	2.3	2.6	−0.3	1.1
Meat	6.7	7.3	−0.8	1.9	0.3	8.8
Dairy	9.8	4.0	1.1	0.1	2.8	5.6
Sugar	−1.5	0.4	−0.5	−5.7	26.7	2.4
Flour	3.4	0.4	2.0	0.6	0.2	−0.1
Bread	1.2	1.8	1.5	0.8	−0.3	1.0
Confectionery goods	4.6	2.3	3.5	2.3	1.7	1.9
Fats and oils	−0.1	3.5	−5.2	−2.6	0.4	6.1
Fruit and vegetables	7.9	6.6	−0.7	5.1	5.5	3.4
Beverages and other foods	8.5	2.7	1.7	4.8	2.4	1.1

[a] CIA indexes of Soviet industrial production. These value-added indexes are calculated independently to avoid distortions in Soviet gross value of output indexes that result from double counting and disguised inflation.
[b] Estimates.

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and in 1983 a boost in livestock herds, an upturn in oilseed production, and some increases in processing capacity have accounted for most of the improvement in the food-processing industry. Preliminary data for 1984 suggest that production growth has stabilized at about 3 percent, although vegetable oil production has declined.

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Factors in the 1976-80 Slowdown

Poor Harvests

With roughly 75 percent of the raw materials for food processing coming directly or indirectly from the farm, the sharp decline in the rate of growth of output during 1976-80 was undoubtedly rooted in the shortfalls in farm output of 1979 and 1980.[7] A series of disappointing sugar beet and sunflower seed crops curtailed the flow of raw materials to those industries. As a result of mediocre grain crops in those two years, livestock slaughter weights were down, lowering industrial meat production. Moreover, the poor fish catch after 1976—reduced by nearly 10 percent because of international restrictions on Soviet access to foreign waters—left a diminished raw materials base for processing.

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Increased Losses

Despite marginal improvement in the gross harvests of vegetables and fruit during 1976-80, Soviet sources report increased losses of these raw foodstuffs, which left less for canning, drying, and freezing. Similar shortages of potatoes, grapes, and berries hurt the beverage sector. According to Soviet press reports, losses of fruits and vegetables worsened as a result of the transport sector's almost total absorption in moving the grain crop and a continued increase in the average length of haul for all food commodities. This increase stemmed from a policy decision to close small

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Table 2
USSR: Average Annual Growth of Output, Inputs, and Factor Productivity in the Food-Processing Industry [a]

Percent

	1971-75	1976-80	1981-83
Output	4.4	0.7	2.7
Inputs	4.4	1.2	3.3
Factor productivity	NEGL	−0.4	−0.6

[a] In the calculation of factor productivity growth (the growth of output not accounted for by the growth of inputs), we measured the increase in inputs as an average of the rates of increase of labor and fixed capital employed in food processing and of purchases of raw materials by food processing from agriculture. These inputs were aggregated in a geometric production function. The coefficients for each input were derived by regression analysis. The measure of output is gross output rather than the sum of the value added in the individual branches of food processing represented in table 1. Output could not be appropriately measured by value added in this calculation because the inputs include material purchases in addition to the contributions of labor and capital employed in food processing itself.

processing enterprises near farm sites and consolidate processing capacity in large, often distant facilities. Congestion on the rail lines and a consequent increase in railcar turnaround time hit fruit and vegetable supplies particularly hard because of their perishability. Shortages of refrigerated trucks and railcars aggravated the situation.

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Declining Quality of Raw Materials

Compounding the shortfalls in deliveries of agricultural raw materials to the food-processing industry in 1976-80 was a deterioration in their quality.[8] Because Soviet processing methods and machinery are not readily adaptable to changes in raw materials, the

[8] Deterioration in quality can be traced to the farms, the procurement agencies, and the transportation network. According to Soviet press statements, poor agricultural practices—faulty measurement and application of fertilizer, careless harvesting, and inattention to crop rotation—were primarily to blame. Rough handling and shortages of storage facilities at procurement centers, as well as rail transportation bottlenecks, an inadequate rural road network, and haphazard loading, also contributed to the erosion in quality.

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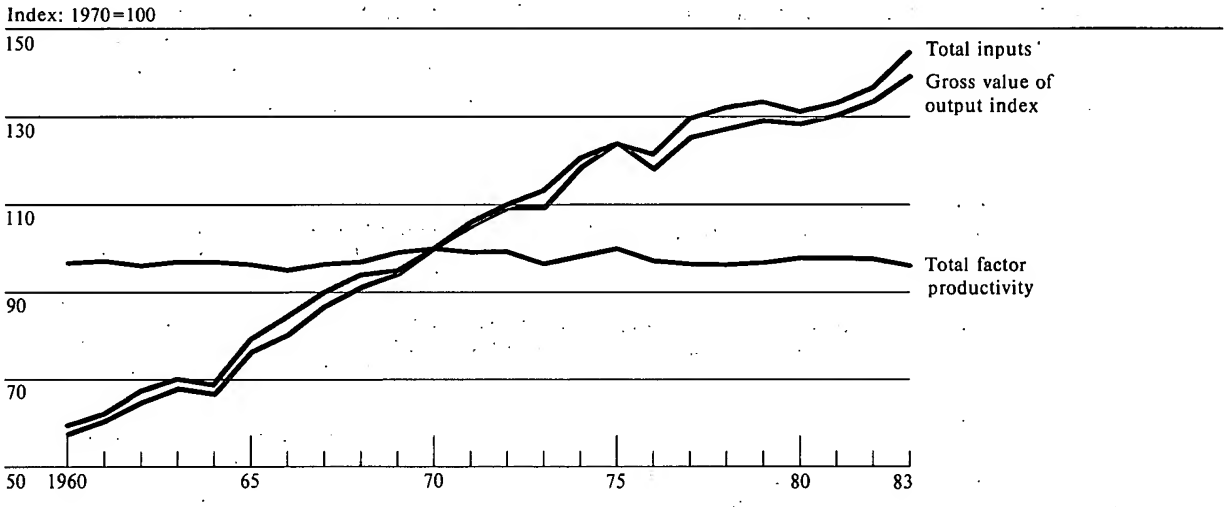
Figure 2
USSR: Factor Productivity in the Food-Processing Industry, 1960–83



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drop in quality led to occasional machinery breakdowns and sometimes to inedible processed food. Equipment was often idle as factories tried to find a way to use low-quality deliveries from agriculture. Some processing sectors required additional raw materials from agriculture to compensate for the poor condition of the produce.[9]

this erosion in quality affected a wide spectrum of foodstuffs:

- Falling levels of gluten in wheat and failure to observe standards for milling flour and baking bread had a detrimental effect on the leavening, softness, taste, and perishability of bread and other baked goods.

- Between 1976 and 1982 the sugar content of beets decreased by 1.5 percentage points, resulting in about 1 million tons of lost sugar.[10] Declining sugar levels in grapes and other fruits used in winemaking also have been reported.

- Numerous complaints in the press cited a lower starch content in potatoes, and more frequent bruising and a higher presence of dirt, stones, and other debris in vegetables arriving at processing facilities. Although Soviet industry experts did not indicate that the situation had worsened, they did note that 20 to 40 percent of all fruits and vegetables delivered to the processing industry during the late 1970s were substandard.

Investment Shortfalls

While grappling with the inadequate supply and declining quality of raw materials, the food-processing industry also had to contend with a lower investment priority. Although total investment in food processing increased from 2.8 billion rubles in 1975 to 3.1 billion rubles in 1980, the industry's share of industrial investment fell from roughly 7.1 percent to 6.3 percent for these same years. Long burdened by neglect, the food-processing industry had to postpone modernization plans because of a meager capital budget, a budget that, was two to three times too small. 25X1 25X1

An increasing share of these limited investment funds was targeted to reconstruction and reequipment. Instead of bringing some needed relief to the food-processing industry, reconstruction disrupted production more than usual. In the case of plant expansion or new plant construction, because of poor planning and the leisurely rate of building, funding ran out before plant completion in some cases, resulting in an increase in unfinished construction. 25X1 25X1 25X1

Because of these and other problems, the Soviets were unable to accelerate the expansion of production capacity. Indeed, the available statistics on physical additions to new capacity show a sharp fall in most cases during 1976-80, as compared with the 1971-75 period (see table 3).[11] Although Soviet food-processing capacity has never been large enough to handle the peak loads of the short, frenetic processing season of several major commodities, the shortage became more troublesome during 1976-80, years of relatively good fruit and vegetable harvests. Additional strain was placed on the already saturated processing lines, causing equipment breakdowns and a slowdown in the pace of processing. Aggravated by a concurrent lack of storage, the consequent production backlog resulted in greater spoilage, with 10 to 15 percent of the delivered crops lost before they entered the factory door. 25X1

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[9] the Soviets require as much as two times the amount of agricultural raw material inputs per ton of processed food as does the United States, in large part because of this deterioration in quality. 25X1

[10] This loss in sugar content due to delays in harvesting and processing and inadequate storage represents $115 million (1984 average price) worth of sugar on the world market. 25X1

[11] Ironically, when the Soviets were able to expand a plant's capacity, they often encountered further obstacles to increasing its production. For example, some meat-processing plants idled by frequent breakdowns because of poor maintenance and a shortage of spare parts reported only half of their capacity in operation during 1976-80. Construction of other large factories was not coordinated with the transportation network, resulting in raw material shortages. Either rural roads were poor or did not connect farms and processing sites, or plant capacity was too large for the raw material base in the local agricultural district, forcing the strained transportation system to haul supplies even greater distances. 25X1 25X1

Table 3
USSR: Gross Additions of New Capacity in the Food-Processing Industry [a]

Thousand tons per shift (except where noted)

	1971-75 Average Annual	1976-80 Average Annual	1981	1982	1983	1981-83 Average Annual
Granulated sugar	17.2	10.6	1.4	7.6	0.9	3.3
Meat	0.8	0.6	0.4	0.6	0.2	0.4
Whole milk products	2.5	1.9	1.7	1.4	2.2	1.8
Cheese (*tons per shift*)	52.2	18.6	45.7	40.3	31.6	39.2
Vegetable oil	0.6	0.8	1.2	0.3	0.5	0.7

[a] Including capacity originating in new construction and in expansion and reconstruction of existing plants.

Source: *Narodnoye khozyaystvo SSSR* for appropriate years.

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Obsolete Equipment

The second phase of the investment strategy—the plan to reequip facilities with modern, higher technology equipment—also met with little success. The average annual rate of growth in production of food-processing machinery declined by approximately two-fifths between the 1971-75 and 1976-80 periods (see figure 3), reflecting problems in acquiring adequate supplies of high-quality steel and other raw materials and difficulties in maintaining technical standards and precision during mass production of more complex machines. Obsolete equipment remained in production (see photographs, page 23).

half of the food-processing equipment manufactured in the USSR during the late 1970s was of pre–World War II vintage, and fewer than half of the systems were automated. This lack of automation forced workers to clean, sort, chop, and mix food items by hand. Processing equipment did not include auxiliary units for loading, weighing, marking, and packaging. Press reports claim that, because of poor meat-cutting technology, Soviet-made meat-processing machines left some 8 percent of meat on the bone. Furthermore, the Soviets continued to use enameled steel, rather than stainless steel, in machinery, a practice abandoned by the West some 20 years ago because of problems with rust and chemical corrosion.

Despite official emphasis on replacing equipment in the industry, managers chose to keep most of the aging capital stock in use because of pressures to increase output. Accordingly, the retirement rate for food-processing machinery was one of the lowest in all of Soviet industry during the 1970s. Having exceeded the standard working life of comparable equipment in the West, processing equipment became more susceptible to breakdowns. Downtime increased substantially in the late 1970s, and,

expenditures to maintain this antiquated equipment surpassed the cost of new equipment by a factor of 1.5.[12]

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Systemic Weaknesses

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Although difficulties with raw materials and capital stock contributed heavily to the production slowdown in 1976-80, other weaknesses also added to food processing's poor performance and magnified the requirement for modern machinery even further.

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Labor. The combination of the second-lowest average wage in industry, highly seasonal employment, and

[12] K. Taksir, *Pravda*, 5 September 1983, p. 2. Although the author does not specify how this difference in cost is calculated, he does emphasize high-level concern over the divergence.

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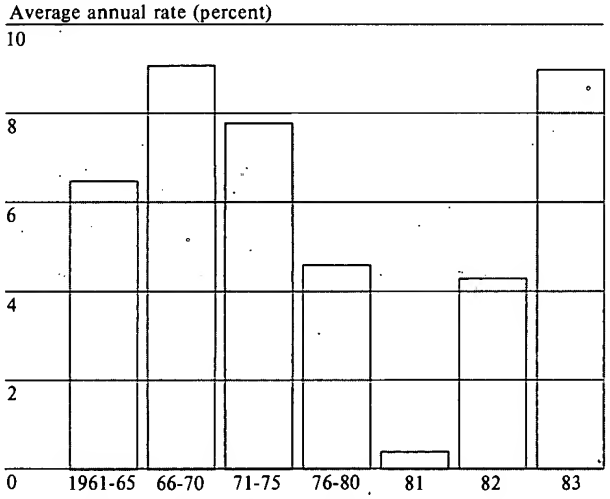
Figure 3
USSR: Growth in Production of Food-Processing Machinery and Equipment[a], 1961-83



[a] Equipment and spare parts for the food-processing, meat, milk, and fish industries, excluding flour-milling, mixed fodder, and granary equipment.

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unpleasant working conditions has made it hard for the food-processing industry to recruit and retain an adequate work force. In fact, its principal drawing card may be the opportunity to steal foodstuffs.[13] The current labor shortages are likely to intensify in coming years as the size of the overall work force decreases.

The shortage of workers has contributed to the narrow assortment of processed foods. Factories have pushed production of a smaller range of items that require little attention from workers, rather than those consumers would prefer. For example, tomato-processing factories in southern Russia in 1980 changed from producing canned tomatoes—a popular item with consumers—to tomato paste, a commodity in little demand. Production of tomato paste uses more tomatoes, and factory managers can claim greater credits toward bonuses for processing record quantities of the vegetable.

[13] Emigre reporting indicates that plan goals have been adjusted downward to compensate for theft. In some sectors, emigres claim that 10 percent of output disappears in this way.

Quality Control. Despite official exhortations to improve standards, worker apathy and a bonus system based on quantity of output have led to poor-quality processed food. The Soviet press laments, for example, that bakers allow a high incidence of half-baked, burnt, or deformed bread loaves to appear on the shelf. Emigres have said that food-industry workers, for example, have diluted milk to meet output targets.

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Secondary Materials. Valuable byproducts from processing—blood, bones, whey, pectin, seeds, and skins—commonly are dumped as waste. Managers of food-processing plants have overlooked these secondary raw materials not only because of shortages of specialized processing machinery, but also because they view their use as unrewarding. In the West, these secondary raw materials provide an additional 25 to 30 percent reserve of raw materials that can be processed as marketable products. For example, whey can be used as a flour substitute, dough conditioner, and meat extender.

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Packaging

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As in the past, Soviet food processing also was constrained in 1976-80 by problems in food packaging.[14] losses in the packaging sector grew slightly during this period, in large part because production of food-packaging materials did not keep pace with the growth in production of processed food. Complaints in the press indicate that shortages of metal and cardboard and, in turn, perhaps a shift to bulk handling of flour, sugar, and selected beverages may have been to blame for the drop in the percentage of processed food packaged. the use of packaging material per value of output in the overall economy declined by 15 percent from 1975 to 1980.

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[14] Food packaging refers to the containers, such as metal cans, glass jars, cardboard boxes, paper bags, and plastic film, in which processed foods are preserved. According to Soviet sources, about 40 to 50 percent of processed foods destined for retail sales in the USSR are packaged—mostly in cardboard boxes, tin and chrome plate cans, and glass jars. This compares with a packaging rate of up to 80 percent in other CEMA countries and more than 95 percent in the United States.

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Table 4
USSR: Capital Investment in the Agro-Industrial Complex

	1976-80		1981-85 Plan		1986-90 Plan	
	Billion 1973 Rubles	Share of Total (*percent*)	Billion 1973 Rubles	Share of Total (*percent*)	Billion 1973 Rubles	Share of Total (*percent*)
Total	**213.0**	**100.0**	**235.0**	**100.0**	**265** [a]	**100.0**
Agriculture	171.0	80.3	189.6	81.4	213	80.4
Food-processing industries [b]	14.7	6.9	15.0 [c]	6.4	18 [c]	6.8
Other [d]	27.3	12.8	30.4	12.2	34	12.8

[a] Estimated on the basis of (1) Mikhail Gorbachev's statement that investment in the 1980s would total about 500 billion rubles and (2) the 1981-85 plan for investment that amounted to 235 billion rubles.
[b] Includes investment on collective farms.
[c] Estimated.
[d] Includes investment in machine building for agriculture and food processing, production of fertilizers and livestock feed additives, fishing, specialized transport, and enterprises of trade and consumer cooperatives.

Source: *Narodnoye khozyaystvo SSSR* for appropriate years.

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In addition to the slower growth in the production of packaging materials, Moscow had to deal with shortages and low technical standards of food-packaging machinery. For example, there have been numerous press complaints that milk cartons leak because too hot pressing irons scorch and weaken the seams, and many instances have been cited of jars breaking when lids are attached because pressure is applied to the glass unevenly.

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More Recent Problems

Although the food-processing industry enjoyed some relief after 1980 from larger agricultural harvests and livestock herds, most of the problems behind the 1976-80 shortfall in production have continued into the early 1980s. In addition, serious administrative problems erupted in 1981 between the fruit and vegetable and food-processing ministries. The fruit and vegetable ministry, whose formation was announced in January 1981, was tasked with the responsibility of centralizing and monitoring production of all fruit and vegetable products. Its tasks include delivering fresh fruit and vegetables to the retail trade network, canning, flash freezing, and drying. Yet the ministry of the food-processing industry has been slow to relinquish its role in canning. The level and tone of press statements suggest that shortages of raw materials and problems of coordination between these ministries have intensified because of bureaucratic squabbles and consequent hoarding.

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Organizational discord and disarray are also apparent at the republic level. In general, the structure of republic ministries mirrors that of all-union organizations. However, some important sectors on the two levels differ in terms of size, responsibility, and intraministerial links, contributing to management and coordination problems.

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The Industrial Experiment and Modernization Program in Packaging

To supplement the reforms of the Food Program, the Soviet leadership included the food-processing industry in two other highly publicized projects. In the first, the food-processing ministry in the Ukraine—a republic heavily involved in food processing—joined four other ministries in an "industrial experiment" giving greater automomy to local enterprises. The experiment, which began in January 1984, simplifies success indicators by which factories in the five participating ministries are judged; it also allows enterprises within the ministries to link earnings to performance and gives them greater freedom in formulating plans.

Preliminary evidence suggests that there has been some improvement in production and an easing of the conflict over resource allocation within the Ukrainian food-processing ministry. It is too early, however, to judge whether any permanent advances have been made or whether the gains will fade when the spotlight turns to other problem areas. At least for the moment, the Soviets appear committed to continuing the experiment in the Ukraine and will extend the reform in 1985 to the Belorussian Ministry of the Meat and Dairy Industry; the Russian Ministry of the Fish Industry; and the Estonian, Belorussian, Moldavian, Latvian, and Azerbaijani Ministries of Food Processing.

The second project focuses on modernization of the packaging materials industry. Its major objectives are to:

- Substitute metal for glass. *The high cost of shipping and storing jars, as well as the frequency of breakage—roughly 25 percent in the Soviet Union—are major disadvantages in using glass. Moscow hopes to switch to metal containers, which are easier to fill and seal and require less sterilization time and storage space. Other claimants for steel and aluminum—the machinery and defense sectors—have high priorities that will leave little high-grade metal for use in canning. But the advantages of metal in packaging are so large the Soviets appear willing to use lower quality metal for this purpose.*

- Increase the use of plastic. *The food sector could extend the shelf life of many perishable items that presently are not packaged by increasing the production of plastic film and bags. Plastics are lighter, add less to shipping costs, and can be used in packaging a wider variety of foodstuffs than competing materials. Nevertheless, it is unlikely that the Soviets can increase the use of plastic wrapping materials much in the future.* 25X1

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high-priority demand from heavy industry and the military leaves less than 5 percent of the available polyethylene material for packaging food. High levels of a substance believed to be a carcinogen have been found in the other major Soviet plastic film, polyvinyl chloride (PVC). PVC is banned in the United States as a food-packaging material because of the potential health risks. The Soviets, however, continue to use it in food packaging in limited amounts. 25X1

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Strategy: More Money for Machinery

The Investment Pie

Faced with mounting difficulties in providing more and better quality processed foods to the population, the Soviet leadership realized it could no longer leave the processing industry on the back burner. In May 1982 Moscow adopted a two-pronged strategy to modernize this sector. The first element of this strategy, promulgated in the Food Program, is to increase investment in the previously neglected agro-industrial machine-building sectors, a decision that the Soviets

hoped would yield high returns in a relatively short time (see table 4). Specifically, planned investment in industries producing machinery for food processing was tripled.

Investment in the food-processing industry itself also was increased, although the composition of investment suggests food processing was again shortchanged. a portion of the investment in agriculture was to be used to build small-scale processing and storage facilities on farmsites. This near-term focus on on-farm processing and storage would give Moscow time to build up the rural road network and other infrastructures and at the same time reduce the raw material waste that results from off-farm processing. During 1986-90, the food-processing industry's share of investment will rise, and construction will be shifted to more integrated, cost-efficient plants located close to farm sites.

The Role of Imports

The second—and unannounced—part of the Soviet agenda is to increase imports of food-processing equipment. Aware that the domestic machine-building sector could not cope with the additional requirements for high-capacity and modern technology—especially in a short time—Soviet trade representatives in early 1982 began an extensive canvass of East European and Western machinery suppliers.

Moscow would rely on imports to fill roughly one-fourth of its needs for food-processing equipment for the 1984-90 period. Moreover, Soviet statements suggested that Moscow's equipment interests span the entire range of food items, with a general preference for comprehensive processing systems rather than individual pieces of equipment.

Soviet trade officials are looking for conventional—not state-of-the-art—technology that could be copied without much difficulty.[15]

During preliminary negotiations in 1982 and 1983, special overtures were made to US companies. Deputy Foreign Trade Minister Sushkov noted in public statements that opportunities for food-processing equipment sales to the USSR were and would continue to be good for US firms despite political tensions between Washington and Moscow.

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Recent Imports

Foreign trade data show that this flurry of maneuvering and negotiation in 1982 and 1983 was translated into a significant step-up in imports. Recently published statistics for 1983 show food-processing machinery purchases jumped to nearly $900 million, a 21-percent hike over 1982 (see table 5).[17] Measured in current prices, imports of food-processing equipment

[17] In perspective, Soviet imports of food-processing machinery represent about one-third of total food-related machinery purchases and almost 80 percent of agro-industrial equipment imported from the West. Agro-industrial machinery purchases, however, account for a very small fraction of total investment in Soviet agriculture.

Calling in the KGB

As part of the overall campaign to upgrade the food-processing industry, Moscow has called on its covert collection organizations to acquire food-processing equipment and technology.

Soviet and East European organizations have stepped up their visits to food-processing facilities in the United States and Western Europe and have collected technical information and engineering specifications from other firms.

Because most food-processing technology is in the public domain and not subject to US or COCOM export controls and because covert acquisition of processing technology would preclude access to training, spare parts, and maintenance agreements, we believe the KGB's operations in this area are not extensive. Rather, this campaign may represent a means to gain insurance against possible future embargoes and probably reflects the Soviet tendency to call on all available resources to solve a high-priority problem.

grew at an average annual rate of 18 percent during 1976-80 and by 2.6 percent annually during 1981-82.

Machinery Mix. Within the food industry, the grain elevator, meat-processing, beverage, and dairy sectors have received the largest additions to their capital stock since 1980. With the exception of grain elevators, these purchases expanded the variety of products that could be manufactured and included companion filling and packaging systems to cut down waste. The largest share of import funds, however, was spent on equipment for canning—an activity having one of the lowest rates of mechanization in the processing industry.

East European Suppliers. Moscow has increasingly called on its CEMA partners and Yugoslavia for food-processing equipment. These countries supplied an average of three-fourths of the Soviet purchases in the early 1980s (see table 6). East Germany, renowned for its high-quality meat- and milk-processing equipment, was the major CEMA supplier, followed by Czechoslovakia and Hungary. Although Budapest earlier had managed to restrain its exports (and keep its processing machinery for domestic food production), Hungarian suppliers acquiesced to Soviet demands in 1983 and increased sales of food-processing equipment by 35 percent. Other East European countries posting large increases in exports of food-processing machinery to the USSR in the first year of the Food Program included Czechoslovakia, Bulgaria, and Yugoslavia.

CEMA machinery imports play an especially large role in the processing of selected food items. According to Soviet statements, CEMA countries supplied 25 percent of the equipment required by the meat and dairy sectors during 1976-80. Similar dependence on CEMA has been reported in Soviet journals in more recent years for equipment for the production of sugar, confectionery goods, canned fruit and vegetables, and dairy products. According to Soviet calculations, the share of output produced on East European equipment since 1980 was as high as 40 percent for these food items.

Contributions From the West. Although sales of Western food-processing machinery to the USSR increased during the 1976-80 and 1981-85 plan periods, they fell short of Western expectations because of strained political relations and higher priority accorded to other hard currency purchases. During 1981-83, Western suppliers lost roughly one-fourth of their 1976-80 share of the Soviet food-processing equipment market to Eastern Europe. US firms were the

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Table 5
USSR: Imports of Food-Processing Machinery and Equipment, by Sector [a]

Million US $

	1976	1977	1978	1979	1980	1981	1982	1983	Plan 1985 [b]
Total	**307.6**	**326.6**	**387.5**	**509.2**	**701.2**	**615.5**	**738.6**	**897.1**	**1,227**
Grain elevators					25.4	37.7	89.9	118.2	NA
Confectionery	26.0	30.8	30.7	34.2	31.7	38.5	34.1	40.4	NA
Meat processing					16.0	18.2	28.2	41.8	NA
Butter and cheese			33.2	41.7	63.8	32.1	30.8	38.3	NA
Vegetable oil							19.7	27.7	NA
Sugar refining	48.4	34.8	51.8	96.8	84.1	94.2	79.6	67.9	NA
Brewing, nonalcoholic beverages	21.5	22.1	42.9	42.3	47.0	53.5	71.7	58.9	NA
Dairy	54.1	55.4	48.2	78.1	74.4	77.1	110.7	96.8	NA
Canning	51.8	75.9	57.7	90.5	186.6	107.1	155.5	218.6	NA
Other	105.8	107.5	122.9	126.2	172.2	157.0	118.3	188.3	NA

[a] Because of rounding, components may not add to the totals shown.
[b] Announced by a Gosplan official in *Ekonomicheskoye sotrudnichestvo stran-chlenov SEV*, No. 9, 1982.

Source: *Vneshnyaya torgovlya SSSR* for appropriate years. Converted from rubles at the official rate of exchange.

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Table 6
USSR: Imports of Food-Processing Machinery and Equipment, by Supplier [a]

	1976-80		1981-83	
	Million US $	Percent	Million US $	Percent
Total	**2,232**	**100**	**2,251**	**100**
Communist countries	1,613	72	1,771	79
East Germany	629	28	656	29
Czechoslovakia	352	16	384	17
Hungary	233	10	248	11
Poland	253	11	232	10
Yugoslavia	94	4	170	7
Bulgaria	53	2	81	4
Developed countries	615	28	471	21
Western Europe	550	25	456	20
United States	58	3	6	NEGL
Japan	8	NEGL	9	NEGL

[a] Because of rounding, components may not add to totals shown.

Source: *Vneshnyaya torgovlya SSSR* for appropriate years. Amounts were converted from rubles at the official rate of exchange.

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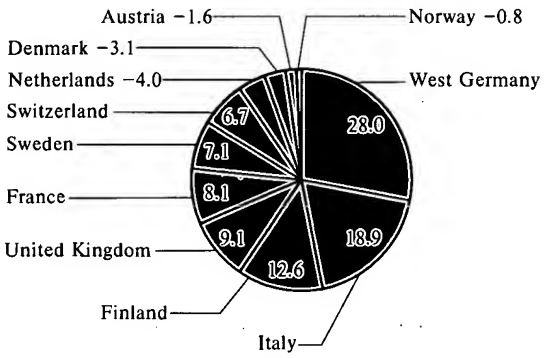
Figure 4
USSR: Shares of Food-Processing Equipment Imports From Western Europe, 1981-83

Percent
Total: US $456 million



Source: *Vneshnyaya torgovlya.*

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hardest hit. Their already small market share dwindled to almost nothing during 1981-83. The majority of US trade involved fruit and vegetable, meat, and beverage equipment. West Germany remained the leading Western supplier, its sales consisting primarily of meat-processing and dairy equipment (see figure 4). Italy and Finland, the other chief West European trading partners, provided a wide variety of food-processing machinery, including meat-processing, canning, and pasta equipment. Much of the equipment imported from the United Kingdom was for margarine and vegetable oil processing.

by Western standards, most of the equipment sent to the USSR employed standard, conventional technology with little of the state-of-the-art technology pioneered by leading Western firms. Nevertheless, in terms of capacity, variety, and general technology, Western businessmen report that Western exports are in large part superior to Soviet and CEMA machinery.

Western machinery also has dominated certain processing subsectors. 25X1

some 70 percent of packaged foods offered for retail sale in the USSR was prepared on imported Western packaging lines. Moscow also has relied heavily on Western technology and equipment for the prodution of powdered infant formula, nonfat dry milk, and continuous-linked sausages. 25X1

Outlook for Imports

Potential Areas of Growth

Statements by Soviet officials at the highest levels suggest strongly that imports of food-processing machinery will accelerate throughout the 1980s as the Food Program gains momentum. Indeed, top Soviet trade representatives have indicated that purchases of processing equipment have been accorded priority and will receive funding, despite possible slow growth in the overall Soviet economy. 25X1

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Orders, trade agreements with Eastern Bloc countries, and reports on contracts from Western businessmen suggest these plans are within reach. We believe that total imports of processing machinery will be $4 billion or more in 1981-85 (see table 7). Purchases in 1984 and 1985 are likely to be roughly $875 million per year, down slightly from 1983 as Moscow postpones purchases until new funding resumes for the 1986-90 five-year plan. 25X1

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We estimate that processing machinery imports could increase to at least $5.4 billion in 1986-90. Our projections are based on a partial Soviet shopping list of equipment and confirmed East European and Western contracts (see table A-2, appendix). 25X1

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Table 7
USSR: Purchases of Food-Processing Equipment

Billion US $

	Actual 1976-80	Projected 1981-85 [a]
Total	**2.2**	**4.0 to 4.4**
Communist countries	1.6	3.1 to 3.6
Other	0.6	0.7 to 1.1

[a] This projection is based on orders, trade agreements with Eastern Bloc countries, and contracts [redacted] It also incorporates statements about planned spending targets for food-processing machinery. Alternative assumptions were derived for the relative roles Communist and Western countries will play as suppliers. The upper end of the range assumes the share of equipment imported from Eastern Europe falls to its 1976-80 mean level of 72 percent during 1984-85 and averages 78 percent in 1981-85. The lower bound assumes that Eastern Europe's share rises to 82 percent in 1984-85 and averages 80 percent during 1981-85.

[redacted]

The Soviets also have sent strong signals concerning the composition of future imports. Moscow will continue to buy food-processing machinery for all sectors but will concentrate on meat and fruit and vegetable equipment because shortages of these types of equipment are most pronounced and because Soviet consumers are most sensitive to supplies of these commodities. Machinery for processing dairy products will be another priority area; [redacted] two dairy-processing enterprises to be built in Moldavia and Belorussia will be supplied completely with imported machinery. [redacted] a majority of these future food-processing equipment purchases will include integrated packaging lines. Moscow does not seem overly interested in the more advanced technology available on the market—such as aseptic packaging and retort sealing—but rather appears primarily to want to raise packaging capacity quickly and thereby increase the percentage of food that is packaged. Special areas of concern include meat packaging, vegetable and fruit canning, and bottle filling and sealing for milk and other beverages. [redacted]

Reliance on CEMA

As the Soviets attempt to lighten the burden of their support for Eastern Europe by improving their terms of trade, they will demand more food-processing and packaging equipment from their Communist partners (see table 8 for examples of future purchases).[18] If there is to be any shift in trade among suppliers, it will likely be toward these countries. Moscow is closely watching developments in East Germany's fledgling robotic meat-cutting sector. Bulgaria is being pressured to step up exports of fruit- and vegetable-processing equipment in the second half of the 1980s, although internal constraints will most likely prevent Sofia from delivering all Moscow wants. [redacted]

[redacted]

[redacted] Moscow may push for other East European countries also to act as middlemen in the future in order to save valuable hard currency and operate at a lower profile. However, because of hard currency constraints of their own, we believe CEMA suppliers will not accept more than a nominal role in this respect. [redacted]

Competition in the West

While Soviet imports of Western food-processing machinery will rise, Soviet concern over becoming dependent on the West and reluctance to increase hard currency borrowing will, in our view, probably limit Soviet purchases of such equipment to about $900 million in 1981-85 and to slightly more than $1.2 billion in 1986-90. Moscow will turn to the West for labor-saving equipment, high-capacity processing equipment, quality-control systems, and a wide range of specialty lines. [redacted]

Competition will be stiff among potential Western suppliers. The Soviets appear particularly receptive to the special financing terms offered by West German, Italian, and French firms for meat, pasta, confectionery, dairy, and canning equipment. [redacted] Soviet trade officials already have placed several orders for 1986-90 with these countries, and other large projects are in the

[18] The Soviets have been running sizable trade surpluses—averaging about $3 billion annually during 1980-83—with Eastern Europe in the form of low-interest trade credits. [redacted]

Table 8
USSR: Selected Future Planned Imports of Food-Processing Equipment From Eastern Europe

Type of Equipment	Number	Supplier
Processing and drying onions and other vegetables	31 lines	Bulgaria
Producing stewed fruit	21 lines	Bulgaria
Processing beans	9 lines	Bulgaria
Producing canned peeled tomatoes	26 lines	Bulgaria
Fruit storehouse equipment	20 sets	Hungary
Manufacturing tin cans	30 lines	East Germany
Producing dried and mashed potatoes	15 lines	Hungary and Yugoslavia
Slaughtering and processing poultry	34 lines	Hungary and Yugoslavia
Processing smoked sausage	24 lines	East Germany and Czechoslovakia
Producing boiled sausage	80 lines	East Germany and Czechoslovakia
Producing sausage casing	1 factory	Czechoslovakia
Prefabricated storage buildings and companion refrigeration, mechanization, and processing equipment for short-term storage at procurement centers	800 units	Yugoslavia

Source: *Vneshnyaya torgovlya SSSR*, January 1983.

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final stages of negotiation. Because of their more competitive contract terms and specialized technology, we believe West Germany, Italy, and France will remain the leading Western suppliers of food-processing equipment to the USSR for some years to come. Aggressive marketing by Denmark and the Netherlands of equipment for processing meat, cheese, and other dairy products suggests they will boost dramatically their current small market share during 1986-90. Japan, also active in expanding trade in this area, will sell more of all types of food-processing equipment but most notably fish-processing machinery. Although the United Kingdom has a favored position in margarine equipment sales, London may be disappointed in sales of other processing equipment because of the more extensive trade campaigns of its West European rivals.

Although the potential for future trade with US firms may not be great, we expect moderate increases over recent levels, especially in machinery for meat, dairy, and fruit and vegetable processing. Although West European food-processing machines in general are more attractive to the Soviets, US equipment does possess some strong selling points such as large capacity, durability, waste-free technology, the availability of training programs and maintenance agreements, and packaging systems—aspects well suited to current Soviet needs. Political considerations may give additional impetus to Moscow to buy US equipment. In the absence of a US agreement to sell top-priority energy equipment, Soviet officials may wish to keep trade channels open with less controversial purchases of food-processing equipment as a gesture of support for better US-USSR relations, as well as a means of maintaining pressure on Washington to relax COCOM controls. The leadership may also hope to see some spillover from improved trade relations in political discussions and perhaps the arms control talks in Geneva.

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Implications for the Food-Processing Sector

The Bottom Line

We believe that the Soviet effort to boost the production of processed food quickly with injections of domestic and imported machinery will work, although the payoff will not be as large or as rapid as Moscow anticipates. Because the Soviet food-processing sector is relatively underdeveloped, the industry is primed to soak up new capital equipment and give higher returns to investment than in other links of the food-production chain, such as farms or the transportation network.

The investment strategy has been helped, moreover, by more rational planning than in the past:

- Processing facilities have been scaled down in size and located near farmsites.
- Processing machinery purchases, to a large degree, will be turnkey, and many will be integrated with agricultural equipment imports.
- Some imports will involve comprehensive worker and management training and supervision.

Because of these factors, we believe Moscow stands a good chance to assimilate technology, reduce waste, and regulate production. The leadership also will avoid, through its purchases of more highly automated food-processing machines, some of the problems that will emerge with the decline in the growth of the labor supply. Perhaps most important, the industry will acquire the potential to improve the quality and variety of processed foods.

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Difficulties Along the Way

Although domestic production of food-processing machinery will receive a higher priority and greater funding, investment will still be insufficient to meet long-neglected requirements. Recent Soviet statements indicate that the processing industry may be constrained again by investment shortfalls because the distribution of planned funding is falling behind schedule. Moreover, more money cannot substantially shorten the long leadtimes necessary for research and development and for bringing prototypes into series production. In addition, the ferrous metals and chemical sectors may be unable to provide adequate supplies of rolled steel, tinplate, rubber, plastic components, and chemical preservatives.

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Machinery imports probably cannot be counted on to offset completely shortfalls in domestic investment:

- imported food-processing equipment, particularly from the West, is more finely tuned and therefore more susceptible to breakdowns than domestic Soviet machinery. Although the Soviets have taken measures to protect the imported equipment—such as including purchases of washing and sorting lines to prepare the primary harvest, replete with stones and debris, for processing— expect Soviet officials to violate the rather rigid technical operating specifications for the machinery.

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- perhaps the most critical constraint on the capacity of imports will be the attitude of Soviet managers. They almost certainly will resist the introduction of the new equipment because the disruptions that will occur when imports are brought into the factory will jeopardize short-term plan fulfillment. Managers may be unwilling to push the foreign equipment to its designed capacity in any case because future production goals could be raised even further.

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- Although the Soviets may establish small pockets of efficient and relatively high-quality processed food production as a result of the machinery imports, they will have a hard time diffusing their gains to the rest of the industry. By relying on imports for technological advances, Moscow will penalize its technical base.

We believe poor synchronization of operations among processing factories, farms, procurement agencies, and the transportation sector and the lack of an adequate incentive system to maintain quality control over agricultural raw materials will probably dilute the campaign to reduce waste.[19] Moreover, the substantial leadtime necessary to alter the mix of packaging materials and increase packaging capacity will preclude any immediate gains from the increased emphasis on packaging foods. According to evaluations of industry experts in the West, the Soviets can expect to cut losses in food processing by an average of 10 to 15 percent. Larger reductions in spoilage may be achieved in the fruit and vegetable sector, the area most susceptible to perishability. These potential gains will not be realized, however, if programs to enhance storage facilities, upgrade roads, and modernize transportation equipment are not fully implemented. Press reports suggest that little progress has been made in this area during 1984. For example, transportation delays in moving sugar beets from the fields have been cited frequently in the press as hindering sugar processing.

Plans for 1981-85 call for output in the food-processing industry to increase by 22 percent, or by an average of more than 4 percent per year (see table 9). We consider these targets to be overly ambitious, largely because growth in net farm output is not likely to exceed 2.0 to 2.5 percent per year for the rest of the 11th Five-Year Plan period. We believe the average annual rate of growth of food-processing output in 1981-85 will more likely be in the range of 2.5 to 3.0 percent.

Because the development of the Soviet food-processing industry will depend strongly on the vicissitudes of agriculture, we have projected a range of forecasts of

Table 9
USSR: Plan Goals for Total Growth of Food-Processing Production

Percent

	1981-85	1981-90
Total food processing	**22** [a]	NA
Meat	28	NA
Milk	13	NA
Processed meat[b]	35	NA
Canned milk	21	NA
Cheese	31	NA
Canned vegetables	50	NA
Flour and groats	10	NA
Soft drinks	50	NA
Mineral water	60	NA
Fruit juice	60	NA
Baby food	100	NA
Tonic drinks	190	NA
Vegetable oil	44	60
Confectionery goods	10	10
Granulated sugar	60	NA
Total sugar	12	40
Macaroni	NA	20
Mayonnaise	NA	50
Champagne	NA	80
Grape wine	NA	60
Beer	NA	30
Tea	NA	70

[a] Revised downward in 1982 from original target of 23 to 26 percent.
[b] Includes sausage, canned meat, stews, and other meats that undergo secondary processing.

Sources: N. K. Baybakov, "On State Plan for the Economic and Social Development of the USSR for 1981-85," *Pravda*, 17 November 1981, and *Planovoye khozyaystvo*, March 1984.

average annual growth in net farm output for 1986-90. These forecasts incorporate different assumptions about weather, leadership attitudes toward supplying agriculture with inputs, and the degree of success of programs to raise efficiency. On the basis of the most

likely scenario for 1986-90, we believe net farm output will increase by an average annual rate of 2.0 to 2.5 percent and production in food processing will grow by 2.5 to 3.5 percent per year.[20] 25X1

Although the Soviets will be unable to achieve planned increases in processed food production, in the eyes of the consumer—and, in turn, the leadership—there will be a payoff in the form of expanded variety, improvements in quality, and an easing of the seasonal fluctuations in the availability of some commodities. 25X1

[20] The baseline projection for growth in the agricultural sector assumes that (a) weather approximates the long-range norms for the balance of the decade (weather would thus be better than that experienced, on average, after 1978, but not as good as that experienced from the mid-1960s to the mid-1970s); (b) given some breathing room because of better weather, planners reduce the current rate of growth of inputs; (c) policy measures to increase productivity are partially successful and at least stop the productivity decline of the 1970s. See *Soviet Agriculture in the 1980s* for details on the best and worst cases. 25X1

Appendix

Table A-1
USSR: Industrial Production of Selected Processed Foodstuffs

	1970	1975	1980	1981	1982	1983	1984 [a]
Meat [b] (*thousand metric tons*)	7,144	9,862	9,140	9,283	9,269	10,106	10,600
Mutton	422	427	346	351	342	372	NA
Pork	2,249	3,335	2,446	2,468	2,402	2,728	NA
Beef and veal	3,463	4,511	4,392	4,381	4,344	4,654	NA
Poultry	357	704	1,224	1,350	1,460	1,573	NA
Other meat	653	885	732	733	721	779	NA
Sausage (*thousand metric tons*)	2,286	2,953	3,074	3,056	3,078	3,193	3,300
Canned meat [c] (*million standard cans*)	817	1,395	927	995	921	987	NA
Fish (*thousand metric tons*)	7,828	10,357	9,526	9,656	9,979	9,900	NA
Canned fish [c] (*million standard cans*)	1,393	2,270	2,830	2,927	2,853	2,918	NA
Whole milk products (*thousand metric tons*)	19,800	23,700	25,500	25,700	26,400	27,800	28,600
Canned milk [c] (*million standard cans*)	1,104	1,465	1,360	1,321	1,329	1,381	NA
Butter [d] (*thousand metric tons*)	963	1,231	1,278	1,210	1,290	1,455	1,500
Cheese (*thousand metric tons*)	466	547	648	656	699	744	NA
Granulated sugar [e] (*thousand metric tons*)	8,196	7,879	7,494	6,836	9,309	9,574	NA
Refined sugar (*thousand metric tons*)	2,005	2,478	2,607	2,664	2,791	2,819	NA
Macaroni (*thousand metric tons*)	1,184	1,337	1,554	1,619	1,634	1,598	NA
Confectionery goods (*thousand metric tons*)	2,896	3,247	3,861	3,951	4,019	4,096	4,200
Vegetable oil [f] (*thousand metric tons*)	2,327	2,744	1,892	1,789	1,769	1,892	1,860
Margarine (*thousand metric tons*)	762	999	1,263	1,361	1,432	1,483	1,400
Canned fruit and vegetables [c] (*million standard cans*)	7,332	9,445	10,111	10,561	11,446	11,753	NA
Juice	1,892	2,644	2,793	3,383	3,597	3,885	NA
Fruits	1,526	1,434	1,736	1,801	2,360	2,588	NA
Vegetables	2,611	3,016	3,370	3,233	3,233	2,916	NA
Tomatoes	1,303	2,351	2,212	2,144	2,256	2,364	NA
Other canned goods [c] (*million standard cans*)	32	53	42	58	56	63	NA
Dried fruit (*thousand metric tons*)	34.7	45.2	33.6	32.1	33.3	56.5	NA
Frozen vegetables (*thousand metric tons*)	4.0	2.6	4.4	2.9	3.9	3.3	NA
Beer (*million dekaliters*)	418.6	570.5	613.3	629.8	646.7	661.0	NA
Grape wine (*million dekaliters*)	268	297	323	344	349	351	NA

[a] Estimated.
[b] Does not include meat produced in private production. Total output was about 16.4 million tons in 1983.
[c] *Canned* refers to both metal cans and glass jars.
[d] Does not include butter produced in private production. Total output was about 1.562 million tons in 1983.
[e] Represents total granulated sugar minus refined sugar.
[f] Represents total vegetable oil minus a margarine equivalent.

Source: *Narkhoz* for appropriate years.

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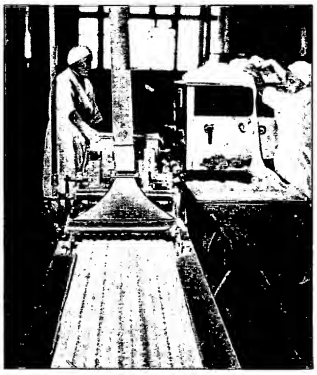
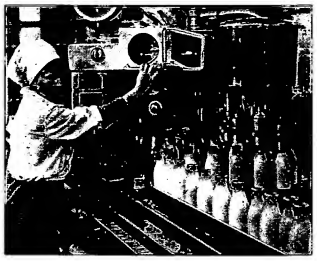
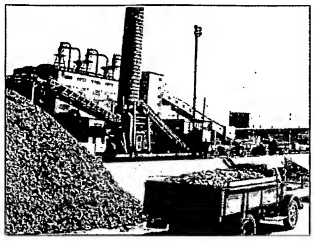
Figure 5
Soviet Food-Processing Equipment



Production of pelmeni, a ravioli-like Russian prepared food.

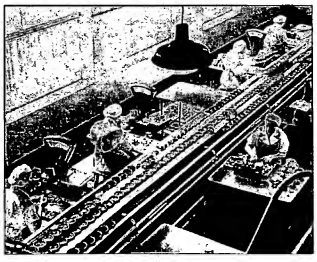


During bottling of milk, many containers are broken because of the pressure applied to the glass.

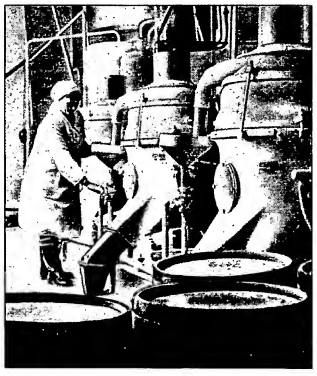


Sugar beets are stored in huge mounds outside the factory. If beets are not processed within 110 to 115 days, a measurable portion of the sugar content is lost.

The end of the production line for bread. One of the staples of the Soviet diet, bread is usually not sliced or packaged.



Inspectors weigh and grade fish before canning.



A Soviet worker monitors a mechanized butter-processing line.

Workers prepare continuous-linked sausages for cooking. Comparable US equipment is fully automated.

Dough-mixing equipment.

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